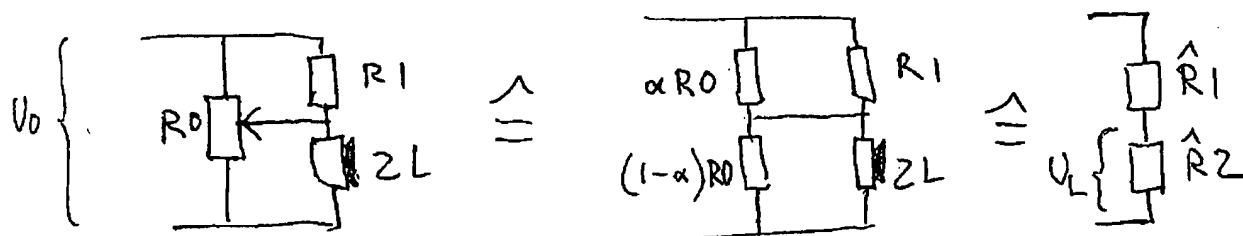


Appendix A I



SCHOLZ

α represents a value from 0 - 1

(attenuation according to position of switch)

$$\frac{1}{\hat{R}_1} = \frac{\alpha R_0 \cdot R_1}{\alpha R_0 + R_1}, \quad \frac{1}{\hat{R}_2} = \frac{(1-\alpha) R_0 \cdot Z_L}{(1-\alpha) R_0 + Z_L}$$

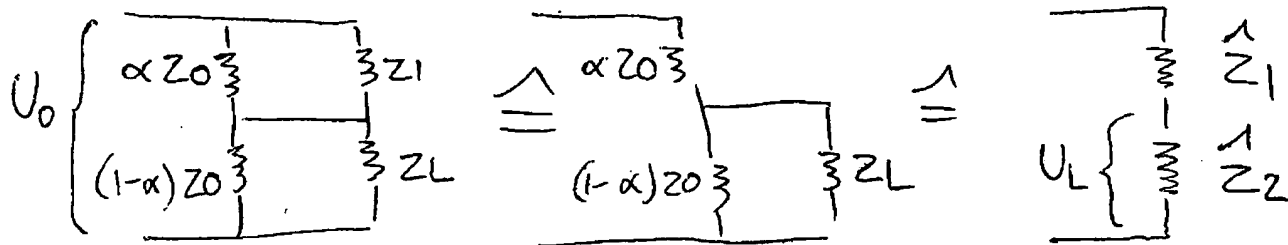
$$U_L = \frac{\hat{R}_2}{\hat{R}_1 + \hat{R}_2} U_0 = \frac{1}{1 + \frac{\hat{R}_1}{\hat{R}_2}} U_0 = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha) R_0 + Z_L}{\alpha R_0 + R_1}} U_0$$

If assumed that $Z_L < R_0$ (SCHOLZ requires $R_1 + Z_L \leq R_0$)

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha) R_0}{\alpha R_0 + R_1}} U_0 \approx \frac{1}{1 + \alpha \frac{R_0}{Z_L}} U_0$$

Because Z_L is frequency-dependent ($R_2 - i\omega L$) the voltage U_L is not in constant relation to U_0

Appendix A II



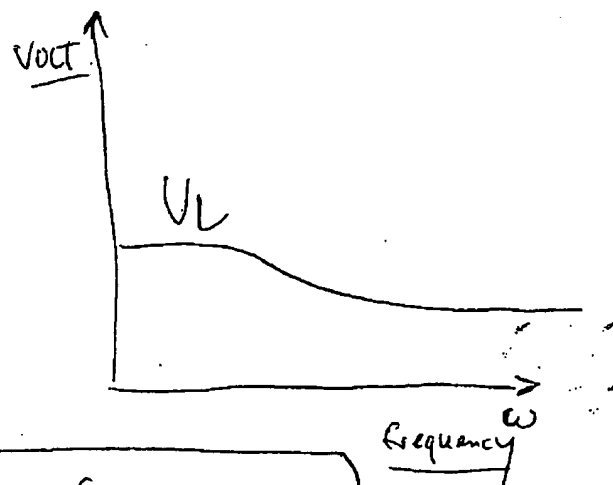
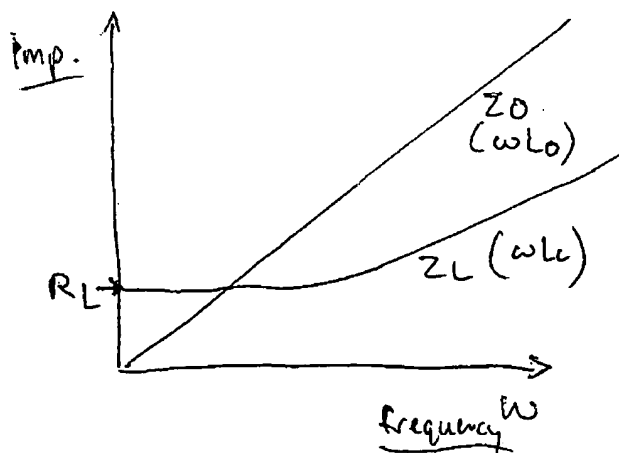
$$U_L = \frac{1}{1 + \frac{Z_1}{\frac{1}{\frac{1}{Z_2}}}} = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot \frac{(1-\alpha)Z_0 + Z_L}{Z_L}} U_0$$

For low frequencies
($Z_0 \ll Z_L$)

$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right)} U_0$$

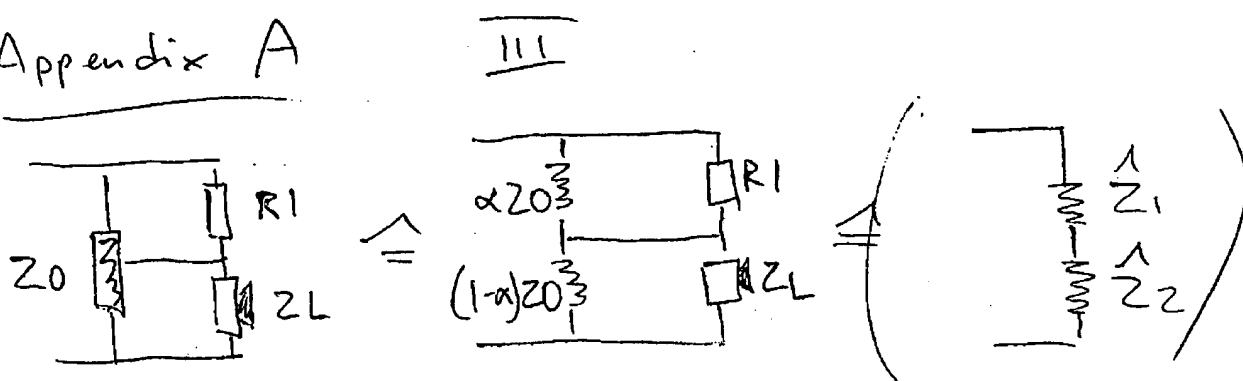
For high frequencies
($Z_L \ll Z_0 \approx -i\omega L_0$)

$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot \frac{(1-\alpha)L_0}{Z_L}}$$



Frequency-dependent in first order

Appendix A



see I

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha)Z_0 + Z_L}{\alpha Z_0 + R_1}} U_0$$

Z_0 is in approximate proportion to $Z_L \Rightarrow Z_0 = \beta Z_L$

R_1 is larger than $Z_0 \Rightarrow \alpha Z_0 + R_1 \approx R_1$

$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot [1 + \beta(1-\alpha)]} U_0$$

no frequency-dependence in first order!